BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC CIRCUIT ON THE BOARD

TECHNICAL FIELD

The present invention relates to a board-mounted electronic device including means for fast electric connection of insulated electric wires to an electric circuit on the board. Such a device is particularly useful for producing electronic gas-lighting devices for gas cookers.

BACKGROUND ART

In currently used electric/electronic devices, various methods are employed for electrically connecting one or more conducting wires to a circuit printed (or carried) on a board; the most common consists in (as shown in EP-A-0177955, US-A-5494456 and EP-A-0727851) soldering the conducting wires to points or seats formed on the printed circuit; another consists in providing the circuit with terminals (normally applied and/or soldered to the board) which are either pressed directly

onto the conducting wires, or are designed to receive corresponding male or female connectors fitted beforehand to the wires.

Such connecting systems are obviously slow, complicated, and therefore expensive and difficult to incorporate in automated assembly procedures.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide an electronic device enabling electric connection of one or more insulated wires to an electric circuit on the device without incurring the aforementioned drawbacks, and which at the same time is compact and inexpensive.

According to the present invention, there is provided a board-mounted electronic device, in particular a gas-lighting device for gas cookers, as claimed in claim 1.

~~comprising : a board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and said blade being so formed as to define means for mechanically retaining and electrically connecting said~~

~~electric wire, and which act on an end portion of said inner conductor~~.

The terminals may thus be formed integrally with the circuit and the supporting board, which form a single whole, e.g. by being formed by co-molding the board in synthetic plastic resin with respective tracks of the electric circuit defined by semicut metal strips; and the electric wires to be connected - which may be external wires for connecting the device to the power supply or to a user device, or wires for electrically connecting one or more electronic components on the device to the board-mounted electric circuit - are connected with no soldering or wire terminations required.

BRIEF DESCRIPTION OF DRAWINGS

Two preferred, non-limiting embodiments of the present invention will be described purely by way of example with reference to the accompanying drawings, in which:

Figure 1 shows an overall view in perspective of a first embodiment of the device according to the invention;

Figure 2 shows a top plan view of a portion of the Figure 1 device;

Figure 3 shows a rear cross section of a second embodiment of the device according to the invention;

Figures 4 and 5 show a rear and side view

respectively of a detail of the Figure 3 device.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Figures 1 and 2, number 1 indicates as a whole an electronic device in accordance with the teachings of the present invention.

Device 1 - in the example, a known gas-lighting device not described in detail (and shown only partly in Figure 1 for the sake of simplicity) - comprises a supporting board 2; an electric circuit 3 carried by board 2 (only part of board 2 and electric circuit 3 is shown for the sake of simplicity); a pair of connecting terminals 4a and 4b connected to respective tracks of electric circuit 3; and a corresponding pair of insulated electric wires 5a and 5b.

Supporting board 2 is molded from synthetic plastic resin and has a face 6 for supporting electronic components.

Electric circuit 3 is known, and comprises a number of tracks (only tracks 7a, 7b, 7c shown partly, for the sake of simplicity) each defined by a semicut metal strip co-molded with supporting board 2.

Insulated electric wires 5a, 5b comprise respective inner conductors 8a, 8b of substantially circular cross section and covered with respective insulating sheaths 9a, 9b coated and/or applied to inner conductors 8a, 8b.

Each sheath 9a, 9b therefore has a cross section in the form of an annulus with an inside diameter equal to

the diameter of the respective inner conductor.

Terminals 4a, 4b are defined by respective conducting blades 10a, 10b forming part of electric circuit 3 and which project from face 6 of board 2 and are carried integrally by board 2.

Conducting blades 10a, 10b are in the form of integral extensions of respective tracks 7a, 7b of electric circuit 3, and are each bent into an L outwards of the plane of board 2.

Each blade 10a, 10b comprises, at a longitudinal end, a respective slot 11a, 11b in the form of a V-shaped groove for assisting insertion of insulated electric wire 5a, 5b inside a respective semicircular seat 12a, 12b, which houses electric wire 5a, 5b, is of a diameter substantially equal to the diameter of inner conductor 8a, 8b, and is formed at the vertex of the V-shaped groove defining slot 11a, 11b.

Slots 11a and 11b have respective cutting edges 13', 13" (slot 11a) and 14', 14" (slot 11b) for making respective incisions 15', 15" and 16', 16" on opposite sides of respective sheaths 9a and 9b when respective electric wires 5a and 5b are inserted inside respective seats 12a and 12b.

Since the diameter of seats 12a and 12b is smaller than the outside diameter of sheaths 9a and 9b and substantially equal to the diameter of inner conductors 8a and 8b, incisions 15', 15", 16', 16" are radially

through incisions.

Inner conductors 8a and 8b, at least at one point, therefore contact conducting blades 10a and 10b to form respective electric connections with electric circuit 3 via the conducting blades.

Moreover, each incision 15', 15", 16', 16" extends circumferentially along an arc of less than 180°, so that the continuity of sheaths 9a and 9b is maintained along respective portions 17a and 17b.

In actual use, by means of incisions 15', 15", 16', 16" and integral portions 17a and 17b, sheaths 9a and 9b cooperate mechanically with respective edges of seats 12a and 12b to retain the ends of electric wires 5a and 5b and so prevent the wires from sliding longitudinally.

Inner conductors 8a and 8b are therefore connected electrically to electric circuit 3 by contacting blades 10a and 10b as described above, and the ends of wires 5a and 5b are secured firmly to respective seats 12a and 12b.

Figures 3, 4 and 5 show a variation 1a of device 1 as described above, and in which, for the sake of simplicity, any similar or identical details are indicated using the same reference numbers.

The device in the second embodiment comprises supporting board 2; electric circuit 3; a pair of electric wires 5a , 5b; and a pair of conducting blades 18a, 18b for connecting electric wires 5a, 5b

electrically and mechanically to electric circuit 3.

Blades 18a and 18b are fitted integrally to supporting board 2 by means of respective stems 19', 19" (blade 18a) and 20', 20" (blade 28b), which also provide for establishing contact with respective tracks 7d and 7e of electric circuit 3.

Figures 4 and 5 show blade 18a; blade 18b is identical and therefore not shown in detail.

Blade 18a comprises a first tab 21a and a second tab 22a, which are positioned at least partly facing each other.

Tab 22a is bent at an acute angle towards tab 21a, so that an edge 23a of tab 22a contacts a surface 24a of tab 21a.

Tab 22a is elastically deformable to permit insertion of wire 5a between tabs 21a and 22a.

Similarly, blade 18b comprises a tab 21b, a tab 22b bent at an cute angle, an edge 23b, and a surface 24b.

With reference to Figure 3, insulating sheaths 9a and 9b are removed from respective ends 25a and 25b of electric wires 5a and 5b to enable inner conductor 8a to contact tabs 21a and 22a of blade 18a, and inner conductor 8b to contact tabs 21b and 22b of blade 18b.

At assembly, electric wires 5a and 5b are inserted inside respective ducts 26a and 26b.

By virtue of the rigidity of inner conductors 8a and 8b, electric wires 5a and 5b deform respective tabs

22a and 22b, so that end 25a is inserted between edge 23a and surface 24a, and end 25b is inserted between edge 23b and surface 24b.

Blades 18a and 18b therefore provide for electrically connecting as well as mechanically retaining electric wires 5a and 5b.

Clearly, changes may be made to device 1 as described herein without, however, departing from the scope of the present invention.